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09/522,832	03/10/2000	Katsuhisa Sawazaki	PMS 257760	4821

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EXAMINER

BAUMEISTER, BRADLEY W

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 02/07/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/522,832

Applicant(s)

Sawazaki et al.

Examiner

Bradley Baumeister

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Jan 29, 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-6 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☒ All b) ☐ Some\* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

## Attachment(s)

- 15) ☐ Notice of References Cited (PTO-892) 18) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 19) ☐ Notice of Informal Patent Application (PTO-152)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_ 20) ☐ Other:

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### DETAILED ACTION

Applicant has filed a CPA (paper #12) including the amendments/remarks set forth in the after-final amendment filed 11/29/2001 (paper #10). As the examiner's position/comments set forth in the subsequent advisory action dated 12/11/2001 (paper #11) are still germane, the advisory action is incorporated into this Office Action, and the substantive portions thereof are reproduced below, single spaced, for ease of reference.

#### *Response to Arguments* (REPRINTED)

1. Applicant's arguments filed 11/29/2001 have been fully considered but they are only partially persuasive.

a. Applicant's proposed amendment of claim 1 was limited to the correction of 112-2nd issues, simplifying prosecution and as such, will be entered upon the timely submission of a Notice of Appeal and Appeal Brief with the requisite fees.

b. Applicants has asserted that the limitation of claim 1 setting forth that the barriers and clad are formed of materials that are "substantially the same" means that "the n-type clad layer and the barrier layer are composed of the same material, but may be differently doped" (REMARKS, page 3, paper #10). Accordingly, the claims are clarified by and limited to this definition (which is supported by, e.g., specification, page 7, lines 1-6), and the 112-2nd rejection is withdrawn.

c. Applicant's declaration filed 11/29/2001 has overcome the drawing objection and any rejections based on the embodiment of FIG 2 as being interpreted as prior art.

d. Regarding the rejection based on Kiyoku et al. '010, the examiner is persuaded that one skilled in the art would not interpret the disclosed light guide 215 to read on the clad of the present claim 1, so the rejection based thereon is withdrawn.

e. Regarding the rejection based on Nakamura et al. '307, Applicant has argued that Nakamura does not anticipate the present claims because that reference possesses a combination of 3 n-type clad layers while Applicant's invention only employs a single n-type clad layer. As an aside, it should be pointed out that while layer 202 of Nakamura is depicted as having a larger bandgap than the active layer, and as such can be deemed a clad, it's primary function is that of a light guide (see e.g., col. 10, line 54) and might be more appropriately referred to as such.

i. Regardless, Applicant's arguments relating to Nakamura are not persuasive because while the claim only sets forth a single n-type clad layer, the claims employ

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the open-ended transition word, "comprising." As such, the claim reads on any structure having *at least* the claimed elements. Since the first n-side layer 201 reads on the applicant's clad layer, the second n-side layer 202 reads on Applicant's intermediate layer, and all of the limitations are anticipated, it is immaterial whether Nakamura also depicts an additional n-type or clad layer 203. Accordingly, the rejection of the pending claims, 1 and 4-6, over Nakamura is maintained.

***Claim Rejections - 35 USC § 102***

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 1 and 4-6 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakamura et al. '307. Note for example FIGs 3-5 wherein a MQW active region 16 is adjacent to n-type region 201 (clad region) which is formed of a material having a larger band-gap than that of the active region and having a thickness of  $< 500$  angstroms. The barrier layers of the active region are disclosed as having a thickness of about 50 angstroms (col. 14, lines 42-51). Also, an intermediate layer 202 is adjacent to the clad region 201 and is recited as being able to be composed of  $\text{In}_k\text{Ga}_{1-k}\text{N}$  ( $0 \leq k \leq 1$ ) (col. 10, lines 45-50).

a. Applicant has previously argued that Nakamura does not anticipate the present claims in light of the amendment to claim 1 now setting forth that the "n-clad layer is formed of material substantially the same as said barrier layers." (REMARKS, amendment A, filed 7/7/2001.) This argument was again asserted during the interview of 2/5/2002. The Examiner does not agree with this assertion. While the embodiment of FIG 5 depicts the tunnel clad layer

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201 as having a larger band gap than that of the barrier, and the disclosure states that it is most preferable if the tunnel layer is an AlGaIn ternary mixed crystal (e.g., col 10, lines 15-), the disclosure is not so limited. Nakamura only requires that the n-side semiconductor layer 201 (“n-type clad”) have a band gap energy larger than that of the active region’s well layers (e.g., col. 10, lines 10-14). This includes clad band gaps which are greater than the active layer’s effective band-gap (which is typically smaller than the barrier’s band-gap), but at the very least would include bandgaps which are the same as the barrier layer (for the situation where the barriers and tunneling/clad are of the same material).

b. In the interview of 2/5/2002, Applicant has also argued that layer 201 is not a clad layer as required by the claim because layer 201 is disclosed as being thin enough to permit carriers to tunnel into the active layer. This argument is not convincing. While the layers 101 and 201 adjacent to the MQW active region are thin enough to allow carriers to tunnel *into* the active layer, Nakamura expressly discloses that carriers “will not overflow the active layer (or escape from the other side) because they are blocked by the first layers (101 and 201) present on a side opposite to the side of the injection” (col. 4, lines 49-52). As such, these layers do, in fact, function as clads to confine carriers.

c. Accordingly, the claims are still anticipated by Nakamura et al.’307

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*Response to Arguments*

4. Applicant's arguments filed 1/29/2002 have been fully considered but they are not persuasive for the reasons set forth above herein.

**INFORMATION ON HOW TO CONTACT THE USPTO**

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, **B. William Baumeister**, at **(703) 306-9165**. The examiner can normally be reached Monday through Friday, 8:30 a.m. to 5:00 p.m. If the Examiner is not available, the Examiner's supervisor, Mr. Eddie Lee, can be reached at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.



B. William Baumeister

Patent Examiner, Art Unit 2815

February 5, 2002